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ABSTRACT

The purpose of this study was to determine whether good and poor readers of the same age levels differed in their performance on a task which required the integration of semantic-syntactic and grapho-phonic information. Fifteen fourth grade good readers, 15 fourth grade poor readers, and 15 second grade good readers read six sentences that had one word missing and tried to respond with designated high and low frequency "target" words. Pairs of the sentences had high, moderate, or poor context clues to the missing words. As the subjects tried to elicit the target words, they were given graphic clues (first and succeeding letters in the target word) until they gave the correct response. The proportion of the total word that was necessary to achieve recognition was the basic unit of analysis; these response data indicate no appreciable differences between older poor readers and the younger good readers. Contextual richness and word frequency affected performances in all groups, but to different degrees. Many skilled readers used graphic information in conjunction with contextual constraints (semantics and syntax) more effectively than the less skilled readers. (RL)

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PREDICTION PROCESSES IN GOOD AND POOR READERS

The role of semantic and syntactic cues in fluent reading has been the basis for much recent controversy. While some have suggested that effective use of the contextual information provided by these cues is the determining factor in differentiating good and poor readers (Goodman & Goodman, 1977; Smith, 1976) others have argued that virtually all readers, regardless of achievement, employ semantic and syntactic cues and other factors must account for achievement differences (Weber, 1971; Kolers, 1975; Allington & Strange, 1977; Allington, 1977). In each of these latter studies use of visual information, or an interaction in the use of visual and contextual information seemed to differentiate good and poor readers. Weber (1971), for instance, noted that the majority of errors by all readers conformed to preceding contextual constraints but that good

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readers seemed to produce errors which more closely approximated visual characteristics of the target word. Similarly, Kolers (1975) found good readers recognition memory for visual features of sentences exceeded that of poor readers. Allington and Strange (1977) found poor readers ignored visual anomalies in text and gave instead a response which fit syntactic and semantic constraints more often than did good readers who seemed more constrained by the visual information. Finally, Allington (in press) demonstrated that poor readers' recognition accuracy suffered more than good readers' when syntactic information was eliminated.

However, use of context does not seem to be an either/or situation. Mason (1977) has demonstrated the interdependence of various types of processing while reading, a result which supports recent interactive and parallel processing models of reading (Rumelhart, 1975; Allington, Mosenthal, Gormley & Walmsley, 1978). A simplified instructional strategy for inducing such interactive processing has been recently proposed by Dahl and Samuels (1977) and is called 'hypothesis-test' training. Here readers are taught to utilize both semantic-syntactic and grapho-phonic information integratively. Instruction of this type produced a higher level of reading achievement than other more traditional methods (Samuels, Archwamety & Dahl, 1974).

However, we still know little about how readers come to develop a sensitive strategy for employing these information sources. Goodman (1965) and Biemiller (1970) have demonstrated that use of contextual information develops with reading achievement and Pearson and Studt (1975) have demonstrated the positive effects of contextual richness and word frequency upon the word prediction behaviors of readers. There is a particular need to clarify the utilization of

semantic-syntactic cues by poor readers. The question, then, for the present study was whether good and poor readers of the same age levels differed in their performance on a task which required the integration of semantic-syntactic and grapho-phonic information. Additionally, the performance of the older readers will be compared to that of younger good readers. These comparisons should also provide an opportunity to test a recent proposal that poor readers have no specific skills deficit but rather perform very much like younger good readers (Guthrie, 1973).

METHOD

Subjects: The subjects were drawn from three cooperating schools. In each school all second and fourth graders were screened for reading ability on the Peabody Individual Achievement Test. Subjects scoring at or above grade level were considered good readers while subjects scoring one year or more below grade level were considered poor readers. From the pools of subjects available from fifteen fourth grade good readers ($\bar{X}_{grade}^{reading}$ = 5.7) and fifteen poor readers ($\bar{X}_{grade}^{reading}$ = 3.3) were randomly selected as were fifteen second grade good readers ($\bar{X}_{grade}^{reading}$ = 3.3). Subjects from three schools were selected in an attempt to minimize specific instructional program effects (Barr, 1977).

Materials: The experimental materials were those employed by Pearson and Studt (1975) and are described in detail there. Briefly, the materials consisted of 36 sentences each with one word deleted and providing three levels of context; rich, moderate, and poor. Two words, of high and low frequency, were designated as target items for each sentence as indicated on the following page.

Word Pairs	Context Level	Sentences
HF Stop	Poor	We decided to _____ for awhile
	Moderate	The men were ordered to _____
LF Halt	Rich	You had better decide to _____ for that red light

Procedure: Subjects were tested individually in small rooms adjacent to their classrooms. The experimenter provided a sample sentence explaining that subjects were to read the sentence and try to think of a word that would make sense in the blank. If the word provided was not the target word then the first letter of the target word would be expressed and they were to read the sentence again and try to think of a word which made sense in the sentence and began with that letter. If an incorrect response followed an additional letter was exposed until either the correct response was elicited or all letters of the word were exposed.

Subjects were given six sentences, two at each level of contextual richness. At each level the subjects had to provide a high frequency target word for one sentence and a low frequency target word for the other.

Results and Discussion

A repeated-measures analysis of variance was used to analyze the data. Because there were differing numbers of letters across synonym pairs the proportion of the total word necessary to achieve recognition, rather than the number of letters, was the basic unit of analysis. This was the same unit of analysis used by Pearson and Studt (1975).

Cell means are reported in Table I.

There were significant main effects for each of the factors under consideration. The 4th grade good readers needed 50.45% of the word to achieve recognition, 4th grade poor readers needed 68.66% and 2nd grade subjects needed 63.31%. These differences were significant $F(2,57) = 11.70$, $p < .001$. The mean for high frequency words was 44.79%; for low frequency words 76.82%. This difference was significant $F(1, 57) = 105.18$, $p < .001$. Unlike the Pearson and Studt study, there was no interaction between frequency and group. This would indicate that the effect for frequency was equally distributed over all groups.

There was a significant effect for context, $F(2,114) = 24.53$, $p < .001$. The mean proportion of word necessary to achieve identification for rich context sentences was 46.0%; for moderate context, 60.9%; for low context, 75.5%. The effect of context differs across the word frequency levels as indicated by the significant interaction between these variables, $F(2, 114) = 4.84$; p .01.

These results, with the exception of the lack of a group x frequency interaction, are similar to the Pearson and Studt (1975) results and their discussion is equally relevant for this study. The fact that 4th grade good readers were able to identify the target words with less graphic information lends credence to their conclusion that the ability to use context is a function of reading proficiency. The context x frequency interaction supports their conclusion concerning response availability. A richer context was more helpful when the target word was a high frequency word. When the target was a low frequency word much more graphic information was needed to achieve recognition. We also found many instances of subjects

supplying the high frequency synonym for low frequency target words.

The second purpose of this study was to determine if readers at different levels employed different strategies to identify unknown words. In order to answer this question the incorrect responses were analyzed to infer which cue systems were being used to arrive at a response. Table II presents the cue systems available as well as a ranking by frequency of use for each of the three groups for the first trial in which there was no graphic cue available. In the absence of graphic cues, the most frequent choice of all groups was to give a response that was semantically and syntactically appropriate ($\bar{X}$ = 81.0). Second grade subjects gave such a response 75.7% of te time, 4th grade poor readers gave such responses 75.9% of the time and 4th grade good readers gave such responses 91.5% of the time. Once graphic cues became available (Table III) the response pattern changed. The most popular strategy was to give no response ($\bar{X}$ = 51.0) with this occurring in second grade subjects 49.8% of the time, in 4th grade poor readers 51.7% of the time, and 4th grade good readers, 51.6%. The second most popular strategy was to give a response that is graphically, semantically and syntactically appropriate ($\bar{X}$ = 27.3%). Second grade subjects gave such responses 26.9% of the time, 4th grade poor readers 23.7% and 4th grade good readers 31.2%. In each of these analyses the older poor readers and the younger readers performed similarly, responding less frequently to semantic and syntactic constraints than the older good readers.

Conclusions:

The response analysis indicates that all subjects were able to utilize graphic, syntactic and semantic cues. Good and poor readers

do, however, seem to differ on the integration of these cue systems. This would support a notion of the reading process that includes an increase in the ability to integrate the cue system as a function of an increase in reading fluency (Pearson & Studt, 1975). In this respect this study also supports Guthrie's (1973) proposal that older poor readers perform like younger good readers. In the absence of visual information (Trial 1) subjects in all groups were likely to supply meaningful responses, that is responses that were syntactically and semantically appropriate. Once graphic information was introduced (Trials 2-4) each group seemed to be effected in somewhat the same fashion. Close to 50% of the subjects in each group chose a no response strategy. This would seem to further support Pearson and Studt's (1975) conclusion concerning response availability. It seems that the subjects were able to achieve an acceptable meaning for the target word but the fact that they lacked a word that fit all the requirements (graphic, syntactic and semantic) inhibited their ability to respond. This conclusion is confounded since the subjects knew their first response was in some way inappropriate. If a response was given, most incorporated the graphic information. In fact, it would seem that graphic acceptability became the most salient cue in selecting a response with the better readers more likely to produce a response that agreed not only with this information, but also with each of the other available noted earlier through the introduction of graphic constraints, inhibited responses, particularly for the less skilled readers.

In summary, then, the older good and poor readers did differ on their ability with the experiemental task but there seems to be no differences in the performances of the older poor readers and younger good

readers. All groups were effected by contextual richness and word frequency but in some cases to different degrees. Finally, more skilled readers seemed to be able to use graphic information in conjunction with contextual constraints more efficiently and effectively than were the less skilled readers.

TABLE I

Cell Means: Percentage of Words Needed for Identification

Subjects	High Frequency			Low Frequency		
	Rich	Moderate	Poor	Rich	Moderate	Poor
4G	7.25	39.85	49.45	59.9	65.85	80.4
4P	31.25	55.3	69.4	74.9	85.85	95.25
2nd	31.7	49.65	69.3	71.0	69.25	88.95

TABLE II

Trial I: Response Type Rankings

Response Type	Groups		
	2nd Grade	4th Poor	4th Good
Semantic & Syntactic	1	1	1
Syntactic	3	3	4
Semantic	4	4	3
No response	2	2	2

TABLE III

Trials 2-4: Response Type Rankings

Response Type	Groups		
	2nd Grade	4th Poor	4th Good
Graphic, Semantic & Syntactic	2	2	2
Semantic & Syntactic	5	5	4
Graphic & Semantic	7	6	
Graphic & Syntactic	3	4	5
Syntactic	6	7	
Semantic			6
Graphic	4	3	3
No reponse	1	1	1

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